4 CRUDE MAJOR EWO NO. :	BE130-E1	REV: 10				
PLANT: 4 CRUDE	SAP COST CENTER:	DD189-600				
W/O # 320814-001 PROJECT / OUTAGE #: SDD108A						
3 SIDE CUT DEBOTTLENECK PROJECT						
MOC #:						
Level 1 - Management of Change Review Will This Change:  Cause the use of different feeds, chemicals, or Cause the use of different process conditions, upstream/downstream plants?  Cause the use of new or modified equipment ( Alter equipment siting, building, trailer location Require modifying existing and/or developing Affect employee emergency response due to a Transfer the responsibility for any environment Alter the permanent staffing level or organization.	instrumentation, process combined which is other than in-kind ons, roads, or fire protection new procedures?  In organizational change?  Intal, health, or safety-relate	d task?				
SAFETY OPERATOR IN VOC S  X Yes No Yes	· · · · · · · · · · · · · · · · · · ·	LANT WELDING? Tes X No				
APPRO	VALS					
OPERATIONS: K. Sohnrey	DATE: 6/14/11	<b>PHONE:</b> 2-2042				
ENGINEERING: P. Murphy	MATE: 6/19/1/	PHONE: 2-1864				
IMPACT. T.L: M. Greenfield	DATE: 6/15/11	<b>PHONE:</b> 2-1179				
MAINTENANCE: V. Massaro Ve Munu	DATE: 6/15/11	<b>PHONE:</b> 2-5995				
	AMIREZ 1 5 2011					

### Engineering Work Order - EWO 6/14/2011 1:01:32 PM

EWO#	5933	Revision:	1	Created On:	
12	Black, Timothy S		D&R		4 Crude
MOC #: 1		Section Two Reviewer:	Preciado, Silvano E.	Equipmen#:	C-1130
Passport W/O:	320814	Project Number:			Shutdown
Item:		SAP Cost Center:	DWRRI-DD189	Status:	Active
S/D EWO #: [	BE130-E1				
Scope:	COMMENTS BY TH CONTRACTOR WEI The flow of 3 S/C Because of this, th the system to allow benefit of approximation the unlikely but tie-in points will al	ISION ADDS A "DETAIL 3" AN E CITY OF RICHMOND PLAN CLD PROCEDURE ALSO REFLEC out of C-1100 to C-1130 is cune system is unable to recover w 32.5 MBD of 35/C in max dimately \$2.235MM/yr. This ship feasible event that this changes oneed to be installed, so that to current C-1130 inlet to a lo	THECK ENGINEER. AN ACTS THESE CHANGES TO THESE CHANGES TO THE PROPERTY OF THE	draulically limited) at 2 able in the crude. Debather to refinery to realize talling a higher C.V. contactly debottleneck the installed on-the-run (O)	HE 9 MBD. ottlenecking a financial ntrol valve. system, new FR) to route
	for a potential OTF	instructions to install a new, has piping spool addition, and to Additionally, the hole in the ware.	remove a reboiler from	the column that will all	ow for the
	patched and reinfo	nired? Yes In	VOC Service? Yes	In Plant Weld	1
Sa	patched and reinfo	nired? Yes In Person Responsible	g-100-100-100-100-100-100-100-100-100-10	In Plant Weld	ling? Yes  Completed O
Sa Design Review	patched and reinfo	uired? Yes In	VOC Service? Yes		1
Sa Design Review Process Engineer	patched and reinforfety Operator Requiring Review	nired? Yes In Person Responsible	VOC Service? Yes		1
Sa Design Review Process Engineer	patched and reinforfety Operator Requiring Review	nired? Yes In Person Responsible	VOC Service? Yes		1
Sa  Design Review  Process Engineer  Instrumentation	fety Operator Requiring Review	nired? Yes In Person Responsible	VOC Service? Yes		1
Sa  Design Review  Process Engineer  Instrumentation  Control System F	fety Operator Requiring Review	nired? Yes In Person Responsible	VOC Service? Yes		1
Sa  Design Review  Process Engineer  Instrumentation  Control System F  Utilities Review	fety Operator Requiring Review	Person Responsible Black, Timothy S.	VOC Service? Yes		1
Sa  Design Review  Process Engineer  Instrumentation  Control System F  Utilities Review  Environmental/R	patched and reinfo fety Operator Requ ring Review Review Review	Person Responsible Black, Timothy S.	VOC Service? Yes		1
Sa Design Review Process Engineer Instrumentation Control System F Utilities Review Environmental/R Land Usage Revi	patched and reinfo fety Operator Requ ring Review Review Review	Person Responsible Black, Timothy S.	VOC Service? Yes		1
Sa  Design Review  Process Engineer  Instrumentation  Control System F  Utilities Review  Environmental/R  Land Usage Review  VOC Review	fety Operator Requiring Review Review Review Regulatory Review	Person Responsible Black, Timothy S.	VOC Service? Yes		1
Sa Design Review Process Engineer Instrumentation Control System F Utilities Review Environmental/R Land Usage Review VOC Review Safety/Regulator	ring Review Review Review Regulatory Review Rewiew	Person Responsible Black, Timothy S.	VOC Service? Yes		1
Design Review Process Engineer Instrumentation Control System F Utilities Review Environmental/R Land Usage Review OC Review Safety/Regulator Building Permits	ring Review Review Review Regulatory Review Rewiew Review Review Review Review Review Review	Person Responsible Black, Timothy S.  Elliott, Brad B.	VOC Service? Yes		1
Sa Design Review Process Engineer Instrumentation Control System F Utilities Review Environmental/R Land Usage Review OC Review Safety/Regulator Building Permits Mechanical Review	patched and reinfo fety Operator Requiring Review Review Review Regulatory Review www.	Person Responsible Black, Timothy S.  Elliott, Brad B.	VOC Service? Yes		1
Sa Design Review Process Engineer Instrumentation Control System F Utilities Review Environmental/R Land Usage Review Safety/Regulator Building Permits Mechanical Review Inspection Review	ring Review Review Review Regulatory Review Review Review Review Review Review Review Review Review	Person Responsible Black, Timothy S.  Elliott, Brad B.	VOC Service? Yes		1
Sa Design Review Process Engineer Instrumentation Control System F Utilities Review Environmental/R Land Usage Review Safety/Regulator Building Permits Mechanical Review Inspection Review Metallurgy Review	ring Review Review Review Regulatory Review Review Review Review Review Review Review Review Review	Person Responsible Black, Timothy S.  Elliott, Brad B.	VOC Service? Yes		1
Sa Design Review Process Engineer Instrumentation Control System F Utilities Review Environmental/R Land Usage Review VOC Review Safety/Regulator Building Permits Mechanical Review Inspection Review Metallurgy Review Contruction Review	ring Review Review Review Regulatory Review Review Review Review Review Review Review Review Review	Person Responsible Black, Timothy S.  Elliott, Brad B.	VOC Service? Yes		1
Sa  Design Review  Process Engineer  Instrumentation  Control System F  Utilities Review	ring Review Review Review Regulatory Review	Person Responsible Black, Timothy S.  Elliott, Brad B.	VOC Service? Yes		1
Sa Design Review Process Engineer Instrumentation Control System F Utilities Review Environmental/R Land Usage Review Safety/Regulator Building Permits Mechanical Review Inspection Review Metallurgy Review Contruction Review Relief System Review	ring Review Review Review Regulatory Review	Person Responsible Black, Timothy S.  Elliott, Brad B.	VOC Service? Yes		1

PHA/HSE Review

### Engineering Work Order - EWO 6/14/2011 1:01:33 PM

EWO#	5933	Revision:	1		Created On:	
Originator:	Black, Timothy S	ABU:	D&R		Plant:	4 Crude
MOC #:	23106	Section Two Reviewer:	Preciado, Silva	no E.	Equipmen#:	C-1130
assport W/O:	320814	Project Number:			EWO Type:	Shutdown
Item:		<b>SAP Cost Center:</b>	DWRRI-DD189		Status:	Active
S/D EWO #:	BE130-E1					
Title:	3 S/C Debottleneck	Project EWO		***************************************		THE REAL PROPERTY OF THE PERSON OF THE PERSO
Scope:	CONTRACTOR WEL	E CITY OF RICHMOND PLAN O D PROCEDURE ALSO REFLEC	TS THESE CHAI			HE
	Because of this, the the system to allow benefit of approximant the unlikely but tie-in points will also the process from it.  The EWO outlines in for a potential OTR new piping tie-in.	out of C-1100 to C-1130 is cue system is unable to recover 32.5 MBD of 3S/C in max diately \$2.235MM/yr. This ship feasible event that this change on need to be installed, so the scurrent C-1130 inlet to a longitudinary of the piping spool addition, and to Additionally, the hole in the virced for structural integrity.	r all of the distill istillate mode would be attainated by the att	late available in the ill enable the refinole by installing a list of the installed control provide additional control valve, in the colure from the colure.	ne crude. Debotery to realize higher C.V. contileneck the con-the-run (O'nal head, if ne nestall two new that will all	ottlenecking a financial ntrol valve. system, new TR) to route occasary.
	Because of this, the the system to allow benefit of approximant the unlikely but tie-in points will also the process from it.  The EWO outlines in for a potential OTR new piping tie-in.	e system is unable to recover 32.5 MBD of 3S/C in max diately \$2.235MM/yr. This ship feasible event that this change oneed to be installed, so the scurrent C-1130 inlet to a long in the value of the system of the	r all of the distill istillate mode would be attainated in its insufficient at a piping spoower inlet that wonigher-C.V. mode remove a rebowalkway platform	late available in the ill enable the refinole by installing a let to adequately deleted to a be installed of the ill provide additional let control valve, in iller from the column left after the refinal enable.	ne crude. Debotery to realize higher C.V. contileneck the con-the-run (O'nal head, if ne nestall two new that will all	ottlenecking a financial ntrol valve. system, new TR) to route occasary.
	Because of this, the the system to allow benefit of approximant the unlikely but tie-in points will also the process from it.  The EWO outlines in for a potential OTR new piping tie-in.	e system is unable to recover 32.5 MBD of 3S/C in max disable; \$2.235MM/yr. This ship feasible event that this change on need to be installed, so the scurrent C-1130 inlet to a constructions to install a new, hipping spool addition, and to Additionally, the hole in the varced for structural integrity.	r all of the distill istillate mode would be attainated is insufficient at a piping spoower inlet that wonigher-C.V. mode remove a rebowalkway platform	late available in the ill enable the refinole by installing a let to adequately deleted to a be installed of the ill provide additional let control valve, in iller from the column left after the refinal enable.	ne crude. Debotery to realize higher C.V. contileneck the con-the-run (O'nal head, if ne nestall two new that will all	ottlenecking a financial ntrol valve. system, new TR) to route occasary.
	Because of this, the the system to allow benefit of approximant the unlikely but tie-in points will also the process from it.  The EWO outlines in for a potential OTR new piping tie-in.	e system is unable to recover 32.5 MBD of 3S/C in max diately \$2.235MM/yr. This ship feasible event that this change on need to be installed, so the scurrent C-1130 inlet to a lonstructions to install a new, hipping spool addition, and to Additionally, the hole in the viced for structural integrity.	r all of the distill istillate mode would be attainated in its insufficient at a piping spoower inlet that wonigher-C.V. mode remove a rebowalkway platform	late available in the ill enable the refinole by installing a let to adequately deleted to a be installed of the ill provide additional let control valve, in iller from the column left after the refinal enable.	ne crude. Debotery to realize higher C.V. contileneck the con-the-run (O'nal head, if ne nestall two new that will all	ottlenecking a financial ntrol valve. system, new TR) to route occasary.
	Because of this, the the system to allow benefit of approximation in the unlikely but the in points will also the process from it.  The EWO outlines if for a potential OTR new piping tie-in, patched and reinform.  Lead Engineer:	e system is unable to recover 32.5 MBD of 3S/C in max diately \$2.235MM/yr. This ship feasible event that this change on need to be installed, so the scurrent C-1130 inlet to a lonstructions to install a new, hipping spool addition, and to Additionally, the hole in the viced for structural integrity.	r all of the distill istillate mode would be attainate ge is insufficient at a piping spoower inlet that wonigher-C.V. mode remove a rebovalkway platform	late available in the ill enable the refin ble by installing a let to adequately del can be installed could provide additional let control valve, in the column left after the reference.	e crude. Debe lery to realize higher C.V. co- bottleneck the on-the-run (O' nal head, if ne install two new mn that will all poiler removal	ottlenecking a financial ntrol valve. e system, new TR) to route cessary. e tie-in points low for the will also be
	Because of this, the the system to allow benefit of approximation in the unlikely but the in points will also the process from it.  The EWO outlines if for a potential OTR new piping tie-in, patched and reinform.  Lead Engineer:  Maintenance:	e system is unable to recover 32.5 MBD of 3S/C in max disable \$2.235MM/yr. This ship feasible event that this change on need to be installed, so the scurrent C-1130 inlet to a longer of the second of the piping spool addition, and to additionally, the hole in the verteed for structural integrity.  Gish, Kurt E.	r all of the distill istillate mode would be attainated by the strain of	late available in the ill enable the refin ble by installing a let to adequately del can be installed could provide additional let control valve, in the column left after the reterm of the column left after the c	e crude. Debe lery to realize higher C.V. co- bottleneck the on-the-run (O' nal head, if ne install two new mn that will all poiler removal	ottlenecking a financial ntrol valve. e system, new TR) to route ecessary. It tie-in points low for the will also be
	Because of this, the the system to allow benefit of approximation in the unlikely but the in points will also the process from it.  The EWO outlines if for a potential OTR new piping tie-in, patched and reinform.  Lead Engineer:  Maintenance:	e system is unable to recover 32.5 MBD of 3S/C in max disable \$2.235MM/yr. This ship feasible event that this change in need to be installed, so the scurrent C-1130 inlet to a longer to the scurrent of the piping spool addition, and to additionally, the hole in the viced for structural integrity.  Gish, Kurt E.  Massaro, Vincent R.  Linares, Elena E.	r all of the distill istillate mode would be attainate ge is insufficient at a piping spoower inlet that wonigher-C.V. mode or remove a rebovalkway platform  Approvers  6/1/2011  6/9/2011	late available in the ill enable the refin ble by installing a let to adequately del can be installed could provide additional let control valve, in the column left after the reterm of the column left after the c	e crude. Debe lery to realize higher C.V. co- bottleneck the on-the-run (O' nal head, if ne install two new mn that will all poiler removal	ottlenecking a financial ntrol valve. e system, new TR) to route ecessary. It tie-in points low for the will also be

### 1.0 SCOPE

The flow of 3 S/C out of C-1100 to C-1130 is currently bottlenecked (hydraulically limited) at 29 MBD. Because of this, the system is unable to recover all of the distillate available in the crude. Debottlenecking the system to allow 32.5 MBD of 3S/C in max distillate mode will enable the refinery to realize a financial benefit of approximately \$2.235MM/yr. This should be attainable by installing a higher C.V. control valve. In the unlikely but feasible event that this change is insufficient to adequately debottleneck the system, new tie-in points will also need to be installed, so that a piping spool can be installed on-the-run (OTR) to route the process from its current C-1130 inlet to a lower inlet that will provide additional head, if necessary.

The EWO outlines instructions to install a new, higher-C.V. model control valve, install two new tie-in points for a potential OTR piping spool addition, and to remove a reboiler from the column that will allow for the new piping tie-in. Additionally, the hole in the walkway platform left after the reboiler removal will also be patched and reinforced for structural integrity.

REV 1: THIS REVISION ADDS A "DETAIL 3" AND REVISES "SECTION A-A" ON DRAWING D-371842 PER COMMENTS BY THE CITY OF RICHMOND PLAN CHECK ENGINEER. AN ADDITIONAL NOTE ON THE CONTRACTOR WELD PROCEDURE ALSO REFLECTS THESE CHANGES TO THE WELD DETAILS.

### 2.0 MATERIALS

- 2.1 New 20" XS x 8" Std. Wt. reducer ordered under MR # 177906.
- 2.2 New Control Valve 11LV030 purchased under MR # 176102.
- 2.3 New ¼" CS plate (ASTM A36 or A516 Gr. 70) and new C4x5.4 (ASTM A36) channel sections, for platform structural repairs, to be provided by Maintenance. Additional detail can be found on Drawings D-371841-0 and D-371842-2, attached.
- 2.4 Maintenance is to provide all remaining bulk and consumable materials including welding rods.

### 3.0 GENERAL INSTRUCTIONS

- 3.1 Piping work shall be in accordance with the "Richmond Refinery Metals Craft Quality Assurance Procedures".
- 3.2 Pipe class for this EWO is 3CS24.
- 3.3 Field verify all dimensions prior to fabrication.
- 3.4 Work shall be performed according to the following (hard copies available upon request):
  - 3.4.1 Refinery Instructions -9900 "Release of Operating Equipment for Mechanical Work".
  - 3.4.2 All piping fabrication shall conform to ASME B31.3
  - 3.4.3 All bolting shall be per drawings and Chevron standard <u>Flange Gasket and Bolting</u>, GR-800, Chart per Gen-SC-5209.

- 3.4.4 All line cutting to be performed per "Line Cutting Approval Procedure", RI-341, Sect 16.
- 3.5 Chevron Inspections to witness and accept all hydro tests.

### 4.0 WORK DESCRIPTION

- 4.1 General Work Requirements / Instructions
  - 4.1.1 HOLD POINT: ALL PLATFORM STRUCTURAL WORK OUTLINED IN THIS EWO SHALL COMPLY WITH GUIDELINES CALLED OUT IN CITY OF RICHMOND BUILDING PERMIT #11-01834.
  - 4.1.2 Demo existing section of piping and old control valve as shown on Demo P&ID D-308311 and Demo Isometric #1 (0955-006-001), attached.
  - 4.1.3 Demo and remove abandoned reboiler E-1137B in accordance with Demo P&ID D-308311 and Demo Isometric #2 (0955-006-003), attached. After rebolier is removed, take necessary precautions to ensure hole in platform is covered/blocked such that the potential for falls is reasonably eliminated.
  - 4.1.4 HOLD POINT: PRIOR TO BEGINNING FABRICATION OF NEW PLATFORM SECTIONS FOLLOWING REMOVAL OF REBOILER, CONTRACTOR SHALL CONTACT ENGINEER OF RECORD (EOR) AL GREENE (AGFO@CHEVRON.COM) AT (510) 242-9010. EOR MUST OBSERVE THE EXISTING FRAMING AFTER PROCESS VESSEL IS REMOVED AND BEFORE ANY EXISTING FLOOR PLATE IS CUT. EOR MUST ALSO VERIFY NEW FRAMING C4 MEMBERS IN PLACE BEFORE PLACEMENT OF NEW FLOOR PLATE. EOR MUST ALSO REVIEW AND APPROVE ANY STRUCTURAL WELD PROCEDURE PRIOR TO FABRICATION AS WELL.
  - 4.1.5 Pending EOR approval of items called out in General Notes 12-14 of Drawing D-371841-0, patch hole in platform at old reboiler location per Drawings # D-371841-0 and D-371842-2.
  - 4.1.6 Install new control valve 11LV030 at old control valve location per Construction P&ID D-308311 and Construction Isometric #1 (0955-006-001). New control valve instrumentation to be installed in accordance with Shutdown EWO #BE608-E1.
  - 4.1.7 Install new piping and tie-points at location adjacent to control valve per Construction P&ID D-308311 and Construction Isometric #1 (0955-006-001), and at location of old reboiler outlet per Construction P&ID D-308311, Construction Isometric #2 (0955-006-003), and Construction Isometric #3 (0955-019-021).
  - 4.1.8 Ensure all other piping connections to old reboiler are isolated with blind flanges as applicable.
  - 4.1.9 Hydrotest new piping per Section 4.5.
  - 4.1.10 Coat structural steel platform per Section 4.6.

### 4.2 Welding Requirements

### 4.2.1 Piping Welds

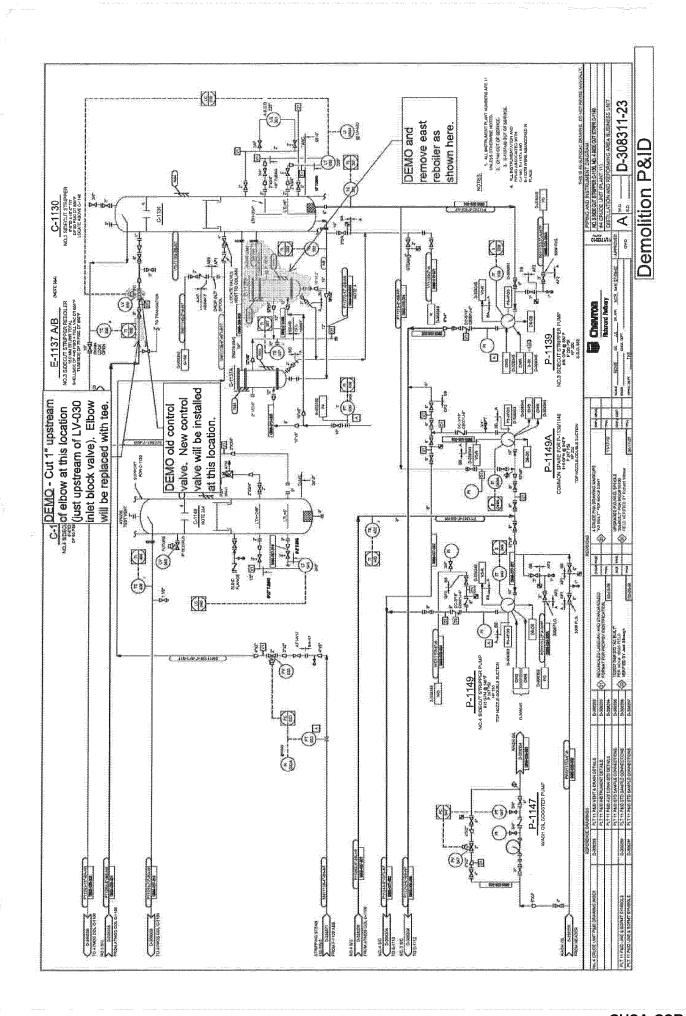
- 4.2.1.1 Use either of the following weld procedures:
  - 4.2.1.1.1 <u>CVX-106</u> (GTAW Root: ER70S-2 or ER70S-3, GTAW fill: ER70S-2 or ER70S-3)
  - 4.2.1.1.2 <u>CVX-109</u> (GTAW Root (and optional 2<sup>nd</sup> pass): ER70S-2 or ER70S-3, SWAW fill: E7018)
  - 4.2.1.1.3 <u>Chevron approved contractor equivalent</u> to the preceding procedures. These alternatives <u>shall</u> be approved by Chevron weld inspector.
- 4.2.2 Structural Welds on Platform (per Drawings D-371841-0 and D-371842-2)
  - 4.2.2.1 Use TIMEC/WorldWide welding procedure WPS <u>D1.1-SG-01A02</u> (SMAW Root: E7018, SMAW Fill E7018). <u>NOTE</u>: Use EOR approved/signed version that is included in this EWO package only.
- 4.3 Stress-Relieving Requirements

N/A

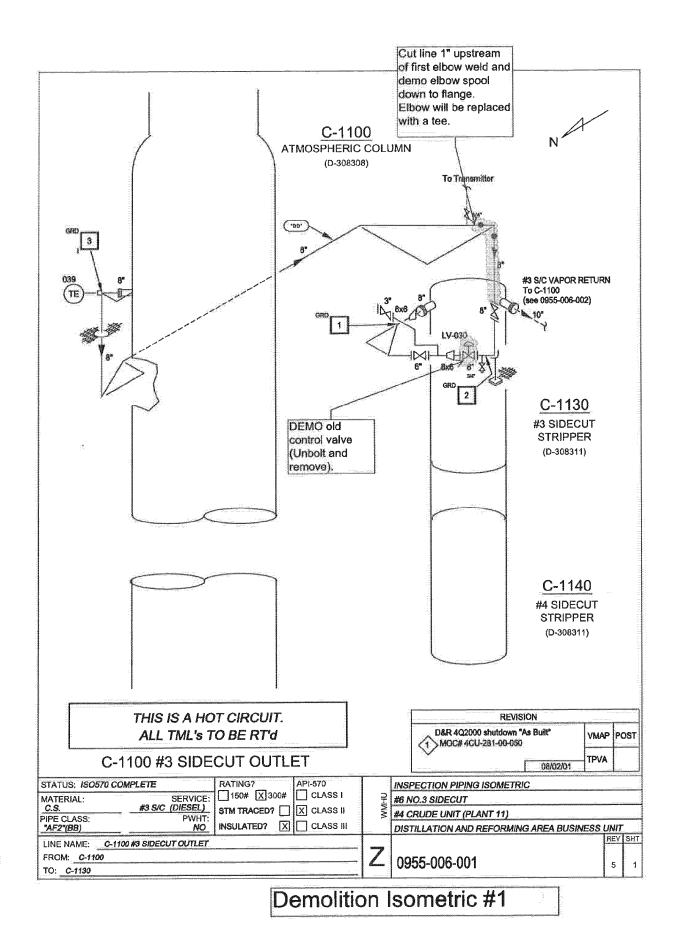
- 4.4 NDE Requirements
  - 4.4.1 RT 5% of random butt welds.
  - 4.4.2 PT weld prep, first pass, and final pass on all new to old welds.
  - 4.4.3 PT final pass of all new to new welds.
  - 4.4.4 Visual test required for all welds.
  - 4.4.5 Any additional NDE as specified by Company Weld Inspector.
- 4.5 Hydrotest Requirements
  - 4.5.1 Hydrotest all welds at 1125 psig, 10 minutes minimum, using fresh water.
- 4.6 Coating Requirements
  - 4.6.1 Coat top surface of new platform materials per Chevron Coating System 4.5, Color: Black.
  - 4.6.2 Coat bottom surface of platform plate material and all new channel iron sections per Chevron Coating System 2.15.1 or 3.1. Color to match existing.

### 5.0 ATTACHMENTS

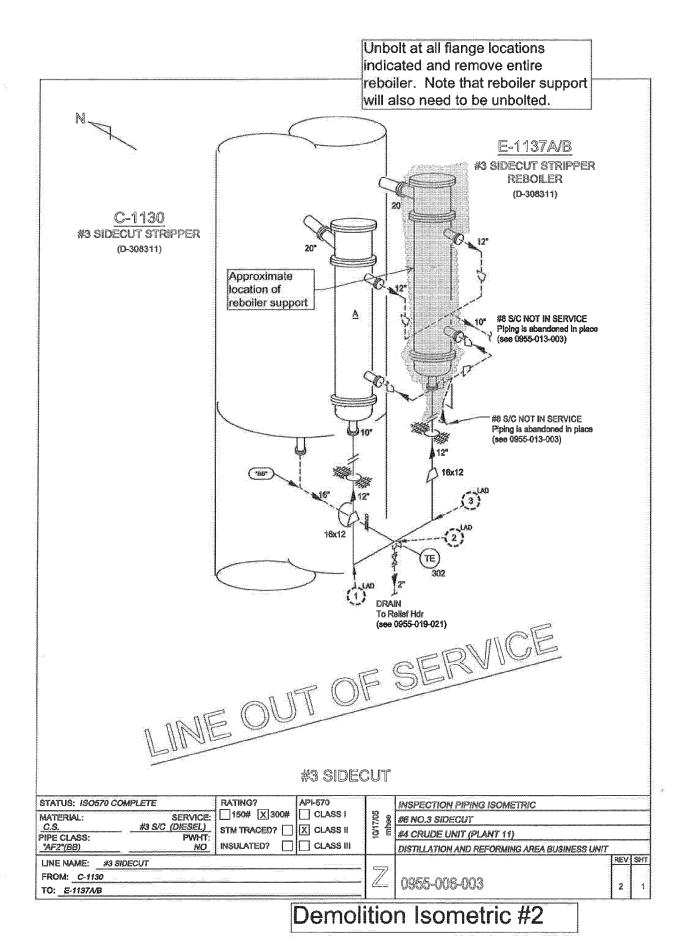
Weld Procedure(s)	CVX-106
` '	CVX-109
	TIMEC WPS D1.1-SG-01A02
Platform Repair Civil Drawings	D-371841-0
	D-371842-2
DEMO P&ID	D-308311
DEMO Isometrics	Demo Isometric #1 (0955-006-001)
	Demo Isometric #2 (0955-006-003)
Construction P&ID	D-308311
Construction Isometric	Construction Isometric #1 (0955-006-001)
	Construction Isometric #2 (0955-006-003)
	Construction Isometric #3 (0955-019-021)
Pipe Class Sheet	3CS24
Coating Systems	2.15.1
-	3.1
	4.5
City of Richmond Building Permit	Permit # 11-01834

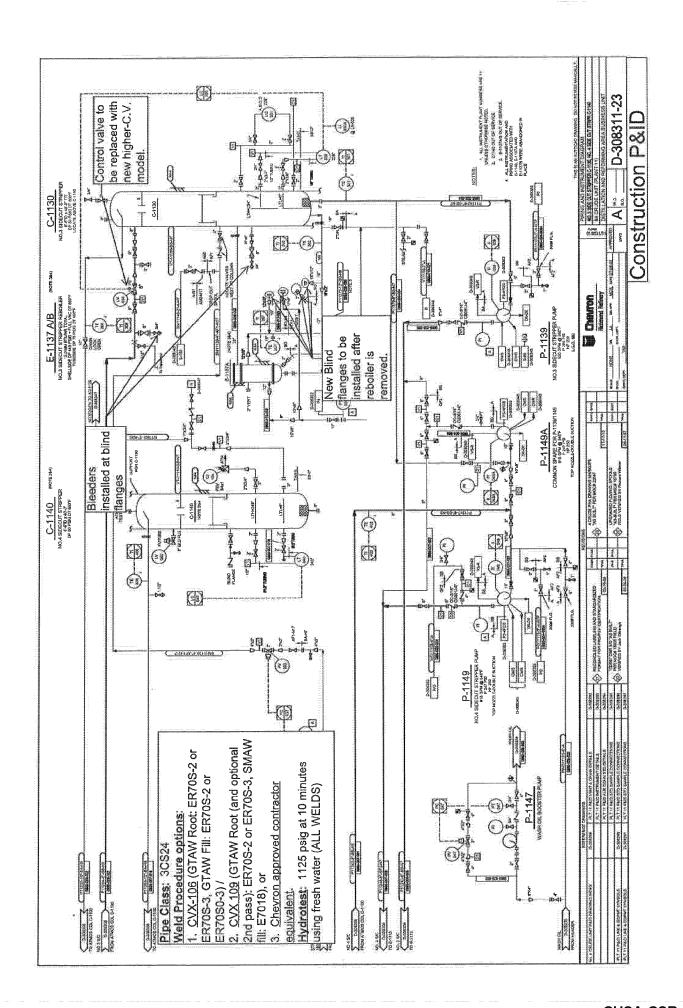


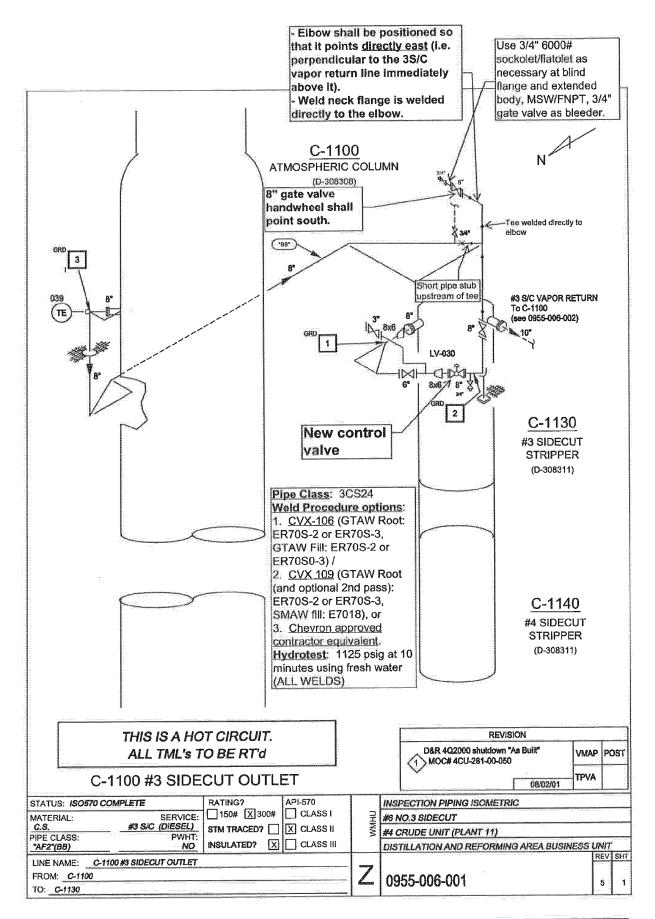
and the same of



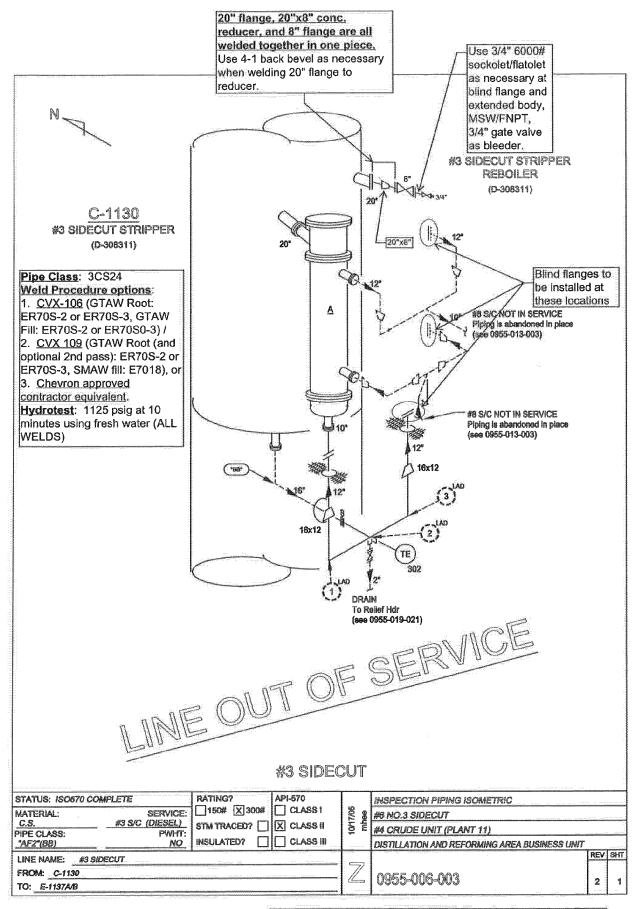
CUSA-CSB-0019175





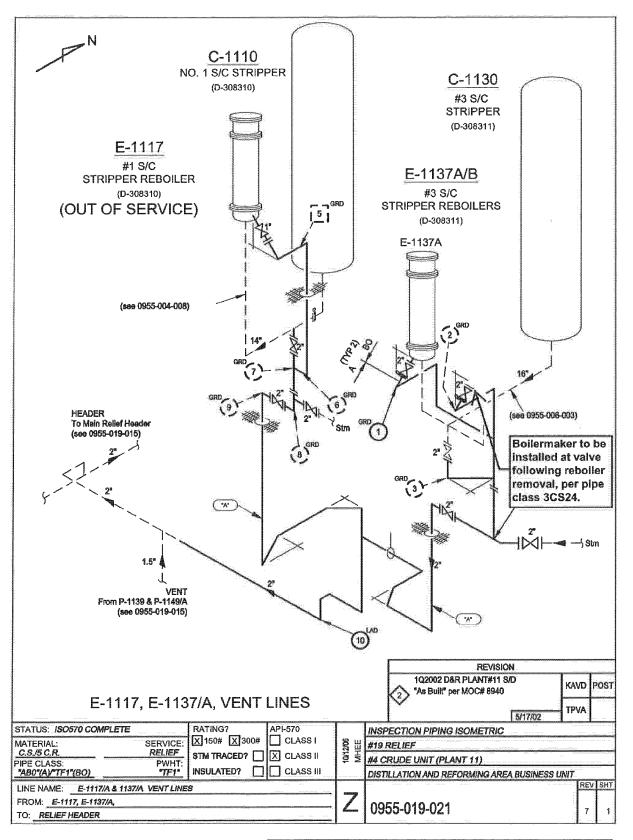


Construction Isometric #1



Construction Isometric #2

**EPA** 



Construction Isometric #3

## GENERAL NOTES

- Design is per CBC 2010.
- Steel channel shapes shall conform to ASTM Plate shall conform to ASTM A36 or A516 Gr. A36.
- 3. Fabricate and erect structural and miscellaneous steel per AISC 360-05, Specification for Structural Steel Buildings, AISC 303-10, Code of Standard Practice for Steel Buildings & Bridges.
- 4. Welding workmanship, materials and inspection shall conform to AMS D1.1. All welds are subject to visual inspection. Weld filter material shall have a minimum transle strength of 70,000 psi. Any SMAW welding shall be performed with low hydrogen electrodes. Welding shall be performed in accordance with a Welding Procedure Specification (WPS) subject to EOR approval.
- Special inspection per CBC 2010 for this <u>minor.</u> It is waived subject to the approval of the work is waived Building Official
- All workmanship and materials shall be subject to the Owner's inspection for conformance to the plans and specifications.
- inspection is subject to replacement at Contractor's Work installed without The Contractor shall arrange for timely on/off-site inspections.
- The Engineer of Record (EOR) is Al Greene, Sechemon, 2001 510-242-9010. agio@chevron.com, αj
- 9. In the event of conflicting wording between the specifications and drawings, contact the Engineer of Record for clarifications.
- Contractor to field verify dimensions and elevations prior to excavation and fabrication.
- 11. Deviations from what is either drawn or specified herein are subject to prior written approval. Requests for changes or deviations shall be documented and submitted in a timely manner to the EOR.

# DOCUMENTATION HOLD POINTS:

2

Submit the following documents to the EOR for review and approval before fabrication or construction in a timely manner: (a) weld procedure specification (WPS).

See Engineering Work Order (EWO)

SPECIAL JOB CONDITIONS

## STRUCTURAL OBSERVATION HOLD POINT ದ್

EOR (or his designes) observation of: (a) Existing framing and plate after process vessel is removed and before any existing floor plate is cut. (b) New framing C4 members in place and before placement of floor plate.

### CONSTRUCTION HOLD POINT 14.

Items 13 (a) and 13 (b). 1

# SEISMIC AND WIND DESIGN DATA

Not applicable



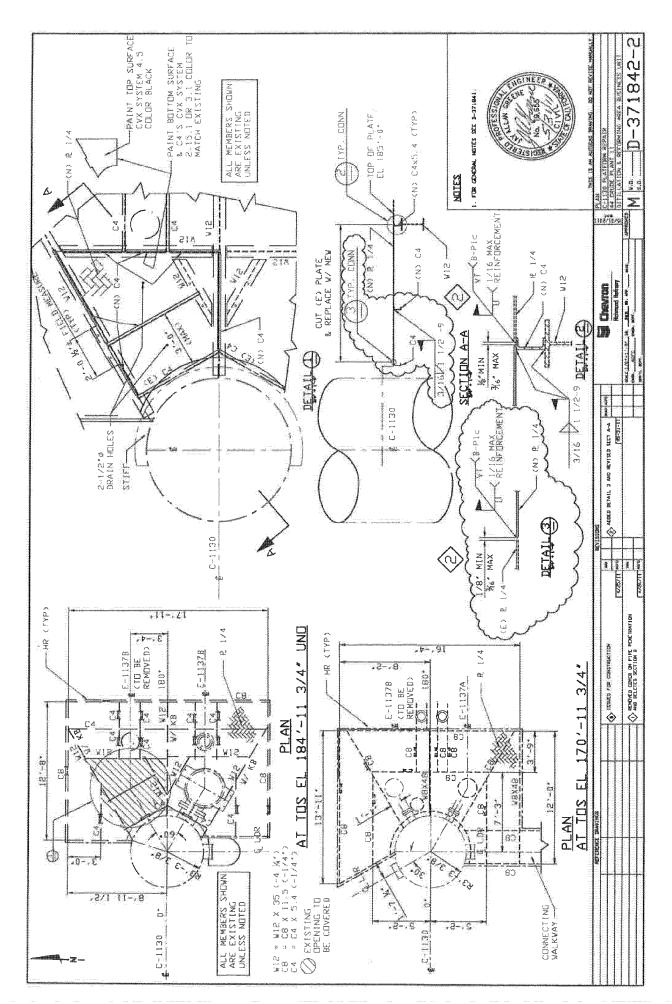
0 - 371841 - 0

ğ ş

BELAZO POR CONESELUTIOS

0

CONSTANTOLE CONTRACTOR ACCOUNTS



### Chevron USA Inc.

SERVICE:

RATING CLASS:

VALVE TRIM:

TEMPERATURE LIMIT:

NOMINAL CORROSION ALLOWANCE:

Process

300 RF, ASME B16.5-2009

Min. to 750F

0,125 in. (0.100 in. MIN) API Trim #8 (13CR & HF) LIMITED BY: MATERIAL:

Flanges Carbon Steel

DESIGN CODE:

ASME B31.3-2008

NONE STRESS RELIEF: EXAMINATION:

5% RT, PT & Visual

\*LIMITATIONS: Pressure limits for steels in hydrogen service. See Note 302.

PRESSURE -	TEMPERATURE F	RATINGS	NOTE: HY	DROTEST	@ AMBIENT = 11	25 psig		<u> </u>
TEMP F	Min. to 100	200	300	400	500	600	700	750
psig	740	675	655	635	600 (280)*	550 (65)*	535 (50)*	505 (50)*
TEMP C	Min. to 38	93	149	204	260	316	371	399
kPag	5100	4655	4515	4380	4135	3795	3690	3480

For NPS 3/4 through NPS 24 (Full flange ratings per ASME B16.5, Table 2-1.1.)

MINIMUM	MINIMUM TEMPERATURE (see Note 300)						
SIZE:	3/4" - 16"	18"	20"	24"			
°F:	-20	-7	-2	+9			
°C:	-29	-21	-19	-12			

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
PIPE	20					
		3/4 - 1 - 1/2	160	PE	CS, SMLS, ASTM A106-B	LIILAIB
		2 - 3	XS 5,	BE	CS, SMLS, ASTM A106-B	L11NA2A
		4 – 10	STD WT	BE	CS, SMLS, ASTM A106-B	L11MA2A
		12 – 24	40	BE	CS, SMLS, ASTM A106-B	L11EA2A
NIPPLES	03, 20			,		
Branch		3/4 - 1 - 1/2	160	PE	CS, SMLS, ASTM A106-B	L34LAEJ
Branch		3/4 - 1 - 1/2	XXS	TOE-POE	CS, SMLS, ASTM A106-B	L34PAHJ
Swage (CONC)		3/4 - 1 - 1/2	160	BBE	CS, ASTM A234-WPB-S, MSS SP-95	L55LA1VA
Swage (CONC)		3/4 - 1-1/2	XXS	BLE-TSE	CS, ASTM A234-WPB-S, MSS SP-95	L35PBMQ
FITTINGS						
Sockolet		3/4 - 1 - 1/2	Class 6000	sw	CS, ASTM A105, MSS SP-97	L36VBDT
Thredolet	03	3/4 - 1 - 1/2	Class 6000	THRD	CS, ASTM A105, MSS SP-97	L36VBAT
SW Elbolet		3/4 - 1 - 1/2	Class 6000	SW	CS, ASTM A105	L36VBDU
Latrolet	92	3/4 - 1 - 1/2	160	Weld	CS, ASTM A105	L56LA1K
Weldolet	05	3/4 - 1 - 1/2	160	Weld	CS, ASTM A105, MSS SP-97	L56LA1H
90 ELL		3/4 - 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L30VBDB
45 ELL		3/4 - 1-1/2	Class 6000	sw	CS, ASTM A105, ASME B16.11	L30VBDA
Tee		3/4 - 1 - 1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L31VBD
Tee	03	3/4 - 1 - 1/2	Class 6000	THRD	CS, ASTM A105, ASME B16.11	L31VBA
Tee (RED)		3/4 - 1 - 1/2	Class 6000	sw	CS, ASTM A105, ASME B16.11	L31VBDD
Plug	03	3/4 - 1 - 1/2		THRD	CS, ASTM A105, round head, ASME B16.11	L370ABW
Plug		3/4 - 1 - 1/2		PE	CS, ASTM A105, round head, ASME B16.11	L370AEW
Coupling		3/4 - 1 - 1/2	Class 6000	sw	CS, ASTM A105, ASME B16.11	L34VBDH
Cap		3/4 - 1 - 1/2	Class 6000	sw	CS, ASTM A105, ASME B16.11	L37VBDX
Reducer (CONC)		2-3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DA
Reducer (ECC)		2 – 3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DB
Weldolet	05	2 – 3	XS	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
90 LR ELL		2-3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1BC
45 LR ELL		2-3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1AC
Tee		2-3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1
Tee (RED)		2-3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1D
Cap		2-3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57NA1R
Reducer (CONC)		4-10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DA
Reducer (ECC)		4-10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DB
Weldolet	05	4-8	STD WT	Weld	CS, ASTM A105, MSS SP-97	L56MA1H
90 LR ELL		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1BC
45 LR ELL		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1AC
Tee		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1
Tee (RED)		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	LSIMAID

November 2009

Page 1 of 3

Chevron USA inc. 3CS24

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
(	Cap	4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57MA1R
Reducer (CO)	•	12 - 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55EA1DA
Reducer (E	•	12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55EA1DB
90 LR I	,	12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50EA1BC
45 LR I		12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50EA1AC
	Tee	12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51EA1
Tee (RI		12 - 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51EA1D
•	Cap	12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57EAIR
VALVES						
	Sate 67	1/2 - 1/2	Class 800	MSW/FSW	CS body, API #8 trim, BB, RP, EXTD BDY	L20KAXHDM
	Pate 15	3/4 - 1-1/2	Class 300	RF	CS body, API #8 trim, BB, RP	L20FA3DD
	Fate 06	3/4 - 1-1/2	Class 800	T/SW	CS body, API #8 trim, BB, RP	L20KA7DD
	Bate	3/4 - 1-1/2	Class 800	sw	CS body, API #8 trim, BB, RP	L20KA1DD
	Pate 325	3/4 - 1 - 1/2	Class 800	sw	CS body, API #8 trim, BB, FP	L20KA1DD
	Sate 161	3/4 - 1-1/2	Class 800	T/SW	CS body, API #8 trim, BELLOW SEAL, BB, RP	L20KA7DDL
	Sate 161	3/4 - 1-1/2	Class 800	SW	CS body, API #8 trim, BELLOW SEAL, BB, RP	L20KA1DDL
	Gate 161,325	3/4 - 1-1/2	Class 800	SW	CS body, API #8 trim, BELLOW SEAL, BB, FP	L20KA1DDL
	Sate 101,323	3/4 - 1-1/2 $3/4 - 1-1/2$	Class 800	MSW/FNPT	CS body, API #8 trim, BB, RP, EXTD BDY	L20KAYHDM
	ate oo	2 - 6	Class 300	RF	CS body, API #8 trim, BB, FP	L20FA3DD
	iate	8 - 24	Class 300	RF	CS body, API #8 trim, BB, FP, GO	L20FA3DDF
		3/4 - 1-1/2	Class 800	SW	CS body, API #8 trim, BELLOW SEAL, WB	1
	obe 161, 307 obe 307	3/4 - 1 - 1/2 $3/4 - 1 - 1/2$		SW	CS body, API #8 trim, BB	L21KA1JEL L21KA1DE
			Class 800		**	F
	obe 307	2 - 2	Class 300	RF	CS body, API #8 trim, BB	L21FA3DE
	obe 307	3 - 8	Class 300	RF	CS body, API #8 trim, BB, GO	L21FA3DEB
	eck 61,328	3/4 - 1-1/2	Class 800	SW	CS body, API #8 trim, BC, piston, HORIZ	L22KA1TEF
	eck 62,328	2 – 24	Class 300	RF	CS body, API #8 trim, BC, Swing	L22FA3PE
	eck 62,328	2 – 24	Class 300	RF	CS body, API #8 trim, Dual Plate	L22FA3LEH
	Ball 26, 101, 164	2 - 12	Class 300	RF	CS, body T3 MOD, Orbit H8 seat	L25FB3FD
	Ball 26, 63, 101	2 - 12	Class 300	RF	CS, body T3 MOD, Orbit H seat	L25FB3FF
Butte		2 – 24	Class 300	RF	CS body, 316 SS trim, Flg, Triple Offset GO	L26FA3TJM
FLANGES	02					
Socket W		3/4 - 1-1/2	Class 300	RF	CS, ASTM A105, ASME B16.5, 160 Bore	L40FA3BL
	ind	3/4 - 24	Class 300	RF	CS, ASTM A105, ASME B16.5	LA3FA3
Blind Specta	icle	3/4 – 14	Class 300	RF	CS, ASTM A516-70, ASME B16.48	L45FA3E
Spacer R	_	16 - 24	Class 300	RF	CS, ASTM A516-70, ASME B16.48	LASFA3FZ
Blind Pl		16 – 24	Class 300	RF	CS, ASTM A516-70, ASME B16.48	LA5FA3GZ
Weld N		2 – 3	Class 300	RF	CS, ASTM A105, ASME B16.5, XS Bore	LA0FA3DN
Weld No		4 - 10	Class 300	RF	CS, ASTM A105, ASME B16.5, STD WT Bore	L40FA3DM
Weld No	eck	12 - 24	Class 300	RF	CS, ASTM A105, ASME B16.5, 40 Bore	LA0FA3DE
Pair WN Ori	fice	2 - 3	Class 300	RF	CS, ASTM A105, ASME B16.36, 1/2 SW taps, XS Bore	L42FA3DNL
Pair WN Ori	fice	4 – 10 -	Class 300	RF	CS, ASTM A105, ASME B16.36, ½ SW taps, STD WT Bore	LA2FA3DML
Pair WN Ori	fice 17	12 – 18	Class 300	RF	CS, ASTM A105, ASME B16.36, ½ SW taps, 40 Bore	LA2FA3DEL
GASKETS		3/4 - 24	Class 300	RF	Spiral wound type 316L SS w/ flexible Inhibited	L61FF1CAC
	301	3/4 – 24	Class 300		Graphite filler, ASME B16.20, w/inner ring. KAM style, 316LSS w/APX-2 Graphite, EXH-SU-5151	L61FF1ZA
			0.000 000			1
ROLTING	301					
BOLTING Stud Bo		3/4 – 24			ASTM A193, Gr B7 stud w/ 2 heavy hex nuts ASTM A194, Gr 2H	L620BM

November 2009 Page 2 of 3

3CS24

### Chevron USA Inc.

### 90° BRANCH CONNECTION, Legend and Chart

	24	20	18	16	14	12	1		6	4				1 1	3/4	17
1/2	S	S	S	S	S	S	S		2	~~~~~	S					Т
3/4	S	8	S	8	S	S	S	5	S	S	S	S	Е	1	T	L
1	S	S	S	8	S	8	S	S	S	S	S	S	E	T		
1-1/2	8	S	8	S	S	S	S	S	S	S	S	S	Т	1		
2	W	W	W	W	W	W	W	W	W	Е	E	T				
3	W	W	W	W	W	W	W	E	Е	E	T	1	e.			
4	W	W	W	W	W	W	Е	E	Е	T	l					
6	W	W	w	E	E	E	E	E	Т	ľ						
8	W	В	E	E	B	E	E	T	1							
*****		E	E	E	E	E	T	1								
					Е	T	1									
				<b></b>	т	1										
				T	1:											
		announce.		1												
			i i													
	6 4 3 2 1-1/2 1 3/4	24 T 20 B 18 E 16 E 14 E 12 E 10 E 8 W 6 W 4 W 2 W 2-1/2 S 1 S 3/4 S	24 T 20 B T 18 E E 16 E E 14 E E 10 E E 10 E E 8 W E 6 W W 4 W W 3 W W 2 W W 2-1/2 S S 1/2 S S	24 T   20 B T   18 E E E E   14 E E E E   10 E E E   10 E E E   10 E E E E E E E E E E E E E E E E E E	24 T 20 E T 18 E E T 14 E E E T 14 E E E E 10 E E E E 6 W W W W 3 W W W 4 W W W 2 W W W 1-1/2 S S S S 1/2 18 16	24 T   20 E T   16 E E E T   14 E E E E E E E E E E E E E E E E E E	24	24 T	24 T   20 E T   16 E E E T   114 E E E E E E T   115 E E E E T   116 E E E E E E E E E E E E E E E E E E	24 T   20 E T   16 E E E T   14 E E E E E E E E E T   10 E E E E E E E E E E E E E E E E E E	24 T   20 E T   16 E E F   T   114 E E E E E E E E E E E E E E E E E E	24 T   20 E T   16 E E F T   14 E E E E E E E E T   17   12 E E E E E E E E E T   19   19   19   19   19   19   19	24 T   20 E T   16 E E F T   16 E E E T   17   12 E E E E E E E E T   19   10   10   10   10   10   10   10	24 T   20 E T   16 E E T   17   14 E E E E E E T   19   10 E E E E E E E E E E E E E E E E E E	24 T   20 E T   16 E E F T   14 E E E E E E E E T   10 E E E E E E E E T   10 E E E E E E E E E E E E E E E E E E	24 T   20 E T   16 E E F T   114 E E E E E E E E E T   17   12 E E E E E E E E E E E E E E E E E E

- E Reducing Tee
- P Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
- T Equal Tee
- S Sockolet
- W Weldolet (Note 05)

### NOTES:

- 03 THREADED JOINTS ARE PERMITTED ONLY AT OUTLET OF VENT AND DRAIN VALVES, AT HYDROSTATIC CONNECTIONS, AT OUTLET OF INSTRUMENT TAKE-OFF VALVES, AND TO MATCH EQUIPMENT.
- 05 INTEGRALLY REINFORCED BRANCH CONNECTIONS ARE PERMITTED OUTSIDE THE SIZES SHOWN IN THE BRANCH CONNECTION TABLE, DESIGNER SHALL CHECK WELD THICKNESS OF INTEGRALLY REINFORCED CONNECTIONS TO DETERMINE IF PWHT IS REQUIRED.
- 06 THESE VALVES SHALL BE USED FOR VENT, DRAIN AND INSTRUMENT CONNECTIONS ONLY.
- 09 PRESSURE AND TEMPERATURE RATING MAY BE LIMITED BY CERTAIN COMPONENTS PERMITTED BY THIS SPECIFICATION. REFER TO MANUFACTURER'S RECOMMENDED PRESSURE-TEMPERATURE RESTRICTIONS.
- 15 TO BE USED WHEN MATING TO FLANGED NOZZLES.
- 20 SCH XXS PIPE AND PIPE NIPPLES SHALL BE USED FOR THREADED CONNECTIONS FOR SIZES NPS 1/2-1-1/2.
- 26 TO BE USED ONLY WHEN INDICATED ON THE P&ID.
- 61 INSTALL IN HORIZONTAL POSITION WITH COVER UP.
- 62 INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
- 300 FOR PIPING SYSTEM MAWP LOWER THAN PIPE CLASS MAX. PRESSURE, SEE FIG. 323.2.2B IN ASME B31.3 FOR REDUCTION IN MINIMUM DESIGN METAL TEMPERATURE.
- 301 FOR USE IN VOC REGULATED SERVICES; IN FLANGES WITH SLIGHTLY DAMAGED GASKET SEATING FACES; OR IN FLANGES WITH A HISTORY OF LEAKING.
- 302 MAXIMUM HYDROGEN PARTIAL PRESSURE FOR STEELS IN HYDROGEN SERVICE. PRESSURE LIMITS ARE BASED ON FIGURE 1 IN API 941 WITH A REQUIRED SAFETY FACTOR OF -50°F (-10°F) AND -50 PSI (-345 KPA).
- 307 LIMITED TO THROTTLING SERVICES UP TO 150 PSI DIFFERENTIAL PRESSURE. FOR SERVICE APPLICATIONS WITH DIFFERENTIAL PRESSURES GREATER THAN 150 PSI, CONSULT WITH THE VALVE MANUFACTURER AND CHEVRON PIPING & VALVE SME FOR SUITABILITY.
- 310 ASME A193/SA193 GR, B7 STUD BOLTING IS LIMITED TO PROCESS SERVICE TEMPERATURES NOT GREATER THAN 700°F TO AVOID THERMAL FATIGUE CRACKING.
- 311 ASME A193/SA193 GR. B16 STUD BOLTING SHOULD BE USED IN ALL PROCESS SERVICES WITH TEMPERATURES GREATER THAN 700°F. FLANGES SHOULD NOT BE INSULATED AT PROCESS SERVICE TEMPERATURES ABOVE 850°F TO AVOID THERMAL FATIGUE CRACKING. AT TEMPERATURES GREATER THAN 850°F, WEATHER SHIELDS OVER FLANGES ARE ACCEPTABLE.
- 325 USE FULL PORT VALVES IN LOCATIONS REQUIRING FULL OPENINGS SUCH AS UPSTREAM AND DOWNSTREAM OF RELIEF VALVES OR IN HORIZONTAL LINES CONTAINING HAZARDOUS LIQUIDS.
- 328 SIZING AND LOCATION OF CHECK VALVES IS CRITICAL FOR RELIABLE OPERATION. SEE SECTION 6.0 (25) IN THE GENERAL SPECIFICATION FOR MORE INFORMATION.
- 17 USE WELD NECK FLANGES AND THROAT TAPS NPS 20 INCH AND LARGER
- 63 ORBIT VALVE WITH TYPE "H" SEATS LIMITED TO 500F.
- 67 USE RESTRICTED ORIFICE FLANGE TAP CONNECTIONS. THREADED NIPPLES TO BE SEAL WELDED. NIPPLE LENGTHS SHALL BE IN ACCORDANCE WITH STANDARD DRAWING D-601407.
- USE RESTRICTED TO THERMOWELL ASSEMBLIES.
- 101 TO BE USED WHERE TIGHT SHUT-OFF IS REQUIRED.
- 161 USE BELLOW SEAL GATE VALVES FOR ALL ÎN-KIND REPLACEMENT ONLY. INSTALL NEW BELLOW SEALVALVES WHEN REQUIRED BY PROJECT FOR PERMIT PURPOSES.
- 164 USE ORBIT VALVES WITH T7 (CORROSIVE) TRIM & TYPE h8 SEAT IN 500 F TO 650 F TEMP RANGE.

### SERVICE:

- HC Liquid Gas & Vapor (Corrosive)
- HC Liquid Gas & Vapor (Corrosive) w/ Trace H2S
- LPG (Corrosive) & LPG w/ Trace H2S
- LPG w/HC Mixtures (Corrosive)
- LPG w/HC Mixtures (Corrosive) w/ Trace H2S
- H2 & H2/HC to 450F (232C)
- H2 & H2/HC w/ Trace H2S to 450F (232C)

November 2009

Page 3 of 3



### ASME - Welding Procedure Specification (WPS)

WeldOffice WPS

WPS record number CVX-106 Date 3/23/2005	Revision 1	Qualified to	ASME Section IX, B31.1 and B31.3 CHEVRON CORPORATION	
Reference docs.	QR-175	A Control of the Cont		

	1
Scope Gas Tungsten Arc Welding of carbon steel butt welds > 2" NPS	Ł
0.00 to 1.00 t	1
Groove, no PWHT (As-welded)	1:
	ŀ
Joint details for this welding procedure specification in:	ŀ
	1
JOINTS section of this WPS	1
	ł.

Carbon steel (P1)	P-no. 1	Grp-no. Any
Carbon steel (P1)	P-no. 1	Grp-no. Any
None	P-no.	Grp-no
7 Page 1		
	Carbon steel (P1)	Carbon steel (P1) P-no. 1 None P-no.

	As-w Min	elded Max.	With Mis.	PWHT Max.
Complete pen.	0,063	0.75	-	
Impact tested Partial pen.	and .	7		
Fillet welds	-	*	, 44,	: #.

	DIAMETER RANGE QUALIFI	ED (FL)
	As-welded V Min. Max. Min	Vith PWHT
Nominal pipe size	>2" nps no max	
	THICKNESS RANGE QUALIF	IED (in.)

FILLER METALS (QW-404)

1 1 mm 11 11 m 12 mm ( 4411 110 1)					and the second s				
	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-w Min.	elded Max.	With F	PWHT Max
GTAW GTAW	5.18 5.18	ER70S-2 or ER70S-3 ER70S-2 or ER70S-3	6 6	1		0.063 0.063	0.75 0.75		
Cons. Insert Flux	*	<u>.</u>	*	*	»·	- None - - None -			

Welding pro	cess		GTAW	GTAW
Туре			Manual GTAW Root Pass	Manual GTAW Fill
Preheat tem	perature	(°F)	50	50
Maximum in	terpass temperature	(°F)	500	500
Tungsten sla	lθ	(kn.)	3/32 or 1/6	3/32 or 1/8
Tungsten ty	pe .		SFA 5.12 EWTh-2	SFA 5.12 EWTh-2
Filler metal s	size .	(trs.)	3/32 or 1/8	3/32 or 1/8
Layer numb	or .		First layer only	2 and above
Position of g	roove		All	All
Weld progre	ssion		Uphill	Uphill
Current/pola	rily		DCEN (straight polarity)	DCEN (straight polarity)
Amperes			55 - 90 70 - 125	55 - 100 70 - 160
Volts			8 - 13 8 - 13	8 - 13 8 - 13
Travel speed	1	(In April)	1 - 8 for all	1 - 8 for all
Maximum he	eat Input	(k.lőn.)		
DC pulsing o	current		Not used	Not used
Shielding:	Gas type		Argon	Argon
	Flow rate	(dh)	15 - 40	15 - 40
Trailing:	Gas type		None	None
	Flow rate	(ch)		N#?
Backing:	Gas type		None	None
	Flow rate	(cfh)	Me .	±#.
String or we	ave		Stringer	Stringer or Weave
Orifice/gas c	up slze		0.5-0.75" - gas lens optional	0.5-0.75" - gas lens optional
Multi/Single	pass per side	Marian Maria	Single pass	Multiple passes
Weld deposi	t chemistry			
Notes	018.0 P F			

WeldOffice WPS 2005.01.036 Catalog n° WPS00010

(c) Copyright 2005 C-spec Softwere. All rights reserved worldwide.

Page 1 of 2



### ASME - Welding Procedure Specification (WPS)

WeldOffice WPS

WPS record number Date	CVX-106 3/23/2005	Revision 1	Qualified to Company name	ASME Section IX, B31.1 and B31.3 CHEVRON CORPORATION
JOINTS (QW-402) Typica	ıl joint(s). See actu	al production drawings and engineer	ing specifications for deta	ills.
T = 0.197 to 0.75"	1/32 to 3/32" 3/32 to 5/32"			7 = 0.187 to 0.76" Run Pipe 23/32" mln.
T = 0.187 to 0.75 3	- FIII	# # #		Fillet throat thickness is the O-Let lesser of 0.7T or 1/4".  T = 0.187 to 0.75"  Weld thick determined by O-Let manufacturer GTAW root peace GTAW Fill
PREHEAT TABLE				opper ver the contains an expression of the contains the
Applicable standard		She had the Taylor of		
ASME B31.1	175 (°F) for thickr 50 (°F) for all othe	ness over 1 (in.) and specified maximur er materials.	n carbon content over 0.309	%·.
ASME B31.3	1 '	ess less than 1 (in.) and specified minin ) and greater thickness, or if specified r	=	
TECHNIQUE (QW-410)	**************************************			
Peening	No	it used	······································	
Surface preparation Initial/interpass cleaning	Bri Bri	ushing and Grinding ushing, grinding, filling or rotary burring	tools to remove all slag and	surface oxide

### NOTES

- 1. This procedure is intended for routine shop and field welding of carbon steel butt welds and branches in larger diameters (> 2" NPS for the main line).
- 2. The welding technique is intended to employ GTAW for all layers to 1" maximum thickness.
- 3. The GTAW filler metal may be AWS/SFA 5.18 Classifications ER70S-2 or ER70S-3.
- 4. If the ambient temperature is less than 50 deg F, preheat the joint to "hand warm" for pipe thickness <1" thick. See Preheat Table for larger thickness.
- 5. Use stringer bead welding technique for the first pass; Use stringer or weave for the remaining passes.
- 6. This procedure is suitable for all positions, but all vertical welding shall be done uphili.
- 7. This procedure may be applied to all carbon steel butt welds where the main line is greater than 2" NPS.

Signature 1	
Name	Signature
M. Fahrion	

3/23/2005

WeldOffice WPS 2005.01.038

(c) Copyright 2005 C-spec Software, All rights reserved worldwide.

Page 2 of 2

**EPA** 



### ASME - Welding Procedure Specification (WPS)

WeldOffice WPS

	·····		7 <b>000</b> ///parantonamentamentonamentonamentonamenton		AA.	eldOffice WPS	· · · · · · · · · · · · · · · · · · ·	Milds				
WPS record number	CVX-109 3/28/200			Revision	1	Qualified to Company name			n IX, B31.1 a			
Supporting PQR(s) Reference docs.	PQR-90-	1 - Rev	1, PQR-90-3 - Rev 1, GTAV	W-SMAW-F	PSP-3				33 - Anna a minima ann ann ann ann ann ann ann ann ann a	nant in the second design of t	***************************************	
Scope	1	-	rc and Shielded Metal Arc Weld HT (As-welded)	ding of cart	oon sleel b	out welds > 2" NPS						***************************************
Joint	1		this welding procedure specification of this WPS	ation in:								
BASE METALS (QW-403)	Location		on the fire				······································		THICKNESS	RANGE QUA	LIFIED	(An
Туре	Carbon s			P-no. 1	****	Grp-no. Any				elded Max	With I	PWHT Max
Welded to Backing:	Carbon s None	• •			Grp-no. Any Grp-no	ſ	Complete pen.	Min. 0.063	0.75	. mue.	, Max.	
Relainers	Note r-10.			10100 <u>17211411177</u>		1 1	Impaci teslad	-	.er.	70	-	
Notes							9 19	Partial pen. Fillet welds	¥	<b>%</b> .		: <del></del>
			ade a a especia de estrución de principiones e a de de a de a de adestración formación (1997). El como estrución de actual de				1 1			ANGE QUAL		ļ.
							-2		As-w Min.	elded Max.	With I Min.	PWHT Max,
								Nominal pipe size	>2" nps	no max		:#
FILLER METALS (QW-404)	Parametri ili	<b>L</b> arrent		Language of the same of the sa	L				<del>,</del>	RANGE QUA elded		(in PWHT
	SFA		Classification	F-no.	A-no.	Chemical an	alysis	or Trade name	Min.	Max,	Min.	Max
GTAW	5.18	3	S-2 or ER70S-3	6	1				0.063	0.75		¥
GTAW SMAW	5.18 5.1	ER703	S-2 or ER70S-3	6	1			0.063 0.188	0.75 0.75	: 44	*	
Cons. insert	:	-		*	*					- No	ne-	<u> </u>
Flux		•		-						- No	ne -	
WELDING PROCEDURE						1						
Welding process Type			GTAW Manual GTAW Ro	oot Pass		GTAW	GT/ Option	aw nai 2nd Pass	E.	SMAW  Manual E7018 Fill		
Preheat temperature		(°F)	50			50		50				
Maximum Interpass temperature Tungsten size		(*F) (lm.)	500 3/32 or 1/6	3		500 3/32 or 1/8		500				
Tungsten type			SFA 5.12 EW			1		EWTh-2	i.		.eer	
Filier metal size  Layer number		(in.)	3/32 or First layer o	1/8		3/32 2nd		or 1/8 frequired	1		/32 or diabove	3/16
Position of groove			All	, ny		)	А		Ť.	A. CON 1	All	
Weld progression			Uphill	1-25		Uphill		T T		Jphill	. :	
Current/polarity Amperes			DCEN (straight p 55 - 90	70 - 125		DCEN (straight polarity) 55 - 90 70 - 125		DCEP (reverse polarity)				
Volls			8 - 13	8 - 13		8 - 13 8 - 13			i 2		20 - 28 2 5 for all	0 - 28
Travel speed Maximum heat input		(in./min) (k.//in.)	1 - 8 for al	I		1 1 1	1 - 8	or all	1. 1.	2-	b for all	
OC pulsing current			Not used			4	Not		¥ F		·÷	
Shielding: Gas type Flow rate		(cfh)	Argon 15 - 40			Argon 15 - 40		M ₩ 				
Trailing: Gas type			None .		15 - 40 None		₩ ₩ ₩					
Flow rate		(cfh)					No		#. #. 1.		94 13	
Backing: Gas type Flow rate		(cfh)	None			T T	INO.		į.		•	
String or weave			Stringer			-1 <b>4</b> .		or Weave	ii.	Stringe	r or Weave	
Orifice/gas cup size Mult/Single pass per side			0,5-0.75* - gas lens Single pas			4		lens optional passes	į.	Multip	le passes	
Maximum pass thickness Weld deposit chemistry		(in.)	·*			4 1 2. 4			## ## #C		0.25	
Notes	140		Lacontition			1	************		I'  -   E			:

WeldOffice WPS 2005,01.036 Calalog nº

(c) Copyright 2005 C-spec Software. All rights reserved worldwide.

Page 1 of 2



### **ASME - Welding Procedure Specification (WPS)**

### WeldOffice WPS

	·	***********************************				
WPS record number	CVX-109		Revision 1	Qualified to	ASME Section IX, B31.1 and B31.3	
Dale	3/28/2005			Company name	CHEVRON CORPORATION	
JOINTS (QW-402) Typical joint(	CEVENCH CORPORATION  COMMAND					
DINTS (GW-402) Typical joint(s). See actual production drawings and engineering specifications  76-80  T = 0.188 to 0.75*  T		45 to 50°				
	T = 0.188 to 0.78"  1/152 to 3/32"  1/152 to 5/32"  1/152 to 3/32"  1/152 to 5/32"  1/152 to 3/32"  1/152 to 3			nde sad sid, national time has side due they not chemically all calls at case		
JOINTS (QW-402) Typical joint(s). See actual production drawings  76-80*  T = 0.168 to 0.76*  4 and greater  Jis2 to 3/32*  3 Continual GTAW Second pass GTAW root pass  GTAW root pass  PREHEAT TABLE  Applicable standard  ASME B31.1  175 (°F) for thickness over 1 (in.) and 50 (°F) for all other materials.  ASME B31.3  50 (°F) for 1 (in.) and greater thickness over		onal GTAW			rillet throat whickness is the O-Let determined by 0-Let by 0-Let by 0-Let by 0-Let by 0-Let annual acturer Graw root pess outlined Graw second pass	
PREHEAT TABLE		- William Control of the Control of				
Applicable standard	rational and a		0.000 (0.		10 April 444 21 Ap	
ASME B31.1		, , ,	ified maximum carbon	content over 0.30%.		
ASME B31.3			•			
TECHNIQUE (QW-410)						
Peaning Surface preparation Initial/interpass cleaning Back gouging method		Brushing and Grinding Brushing, grinding, filing o	or rolary burring tools to	remove all slag and surface oxide		
NOTES				0.11000011141	- The state of the	
1. This procedure is intended for r	outine shop and f	ield welding of carbon stee	el butt welds and branci	nes in larger diameters (> 2" NPS for	the main line).	
2. The welding technique is intend	led to employ GT.	AW for the first or first and	second weld layers.		T = 0.188 to 0.75" Run Pipe 3/32" min.  Fillet throat thickness is the lesser of 0.7T or 1M".  T=0.163 to 0.75" Graw roup pees 0.163 to 0.75" encord pees 2.7515 fills  T=0.163 to 0.75" encord pees 0.7515 fills  T=0.168 to 0.7515 fills	
T = 0.188 to 0.78 3 Orteral GTAW Optional GTAW Optional GTAW Optional GTAW T = 0.188 to 0.75 3 Orteral GTAW Optional GTAW Optional GTAW Optional GTAW T = 0.188 to 0.75 0 Orteral GTAW T = 0.188 to 0.						
4. E7018 welding electrodes will b	e used for all wet	d passes above the root p	ass or second pass.			
5. If the ambient temperature is le	ss than 50 deg F,	preheat the joint to "hand	warm" for pipe thicknes	ss <1" thick. See Preheat Table for la	rger thickness.	
6. Use stringer bead welding tech	nique for the first	pass; Use stringer or wea	ve for the remaining pa	sses.		
7. This procedure is suitable for al	l positions, but all	vertical welding shall be d	ione uphili.			
8. This procedure may be applied	to all carbon stee	i butt welds where the mai	in line is greater than 2'	NPS.		
1						

	atgriature i	
	Name	e-Millorine
	M. Fahrion	
1	Date	
	3/28/2005	

WeldOffice WPS 2005.01.036 Catalog n° WPS00013 (c) Copyright 2005 C-spec Software, All rights reserved worldwide, Page 2 of 2



### TIMEC Company, Inc. 155 Corporate Place Vallejo, CA 94590

### AWS D1.1 Prequalified Welding Procedure Specification (WPS)

WPS No. D1.1-SG-01A02

Date 5/11/2011

Rev. No. 0

Page 1 of 1

Reviewed By:

Rick Johnson

Joint Designation B-Pic

Date 5/11/2011 QC Manager (CWI)

Welding Process SMAW

Welding Method Manual

Joint Design Used

Weld Type PJP Groove welds

Joint Type Butt Joint

Groove Type Square groove

Double Welded No

Backing No

Material N/A

Root Opening T1/2

Root Face N/A

Groove Angle N/A

Radius N/A

Back Gouging No

Method N/A

Weld Size (E) = T1/2

Minimum PJP Weld Size (E) must meet requirements of Table 3.4

Base Metals

Base Metal ASTM A 516, Grade 70 Thickness: Groove 1/8 - 0.25 in.

Thickness: Fillet N/A Pipe Diameter 3/8 In. min.

Filler Metals

AWS Specification 5.1 **AWS Classification E7018** Trade Name Low Hi Weld Size 0.0625 in.

Shielding

Gas N/A

Flow Rate -

Gas Cup Size N/A Electrode-Flux (Class) N/A

Flux Trade Name N/A

Preheat

Preheat Temperature, Min. 32°F

Interpass Temperature, Min. 32°F

Max. 550°F

Minimum Prehent and Interpass Temperatures for given thickness:

1/8" thru 3/4" incl.: 32°F (70°F if less than 32°F)

Over 3/4" thru 1-1/2" incl.: 50°F Over 1-1/2" thru 2-1/2" incl.: 150°f

Over 2-1/2": 225°1

REINFORCEMENT 1/32 TO

NO TOLERANCE

Position

Weld Position: Groove All Positions

Weld Position: Fillet N/A

Vertical Progression Vertical up

**Electrical Characteristics** 

Power Source

Current / Polarity DCEP (reverse)

Transfer Mode N/A

Tungsten Electrode: Type N/A

Size N/A

Technique

Stringer or Weave Bead Stringer or weave bead

Multi-pass or Single Pass (per side) Single or multipass

Number of Electrodes N/A

Electrode Spacing: Longitudinal N/A

Lateral N/A

Angle N/A

Contact Tube to Work Distance N/A

Peening None

Interpass Cleaning Slag Hammer / Wire Brush

Postweld Heat Treatment

Temperature None

Time (hr.) None

Walding Dragatura

		:#		MEIGHN LIGGEOUS				
Puss	75.0°	Filler Meta	el .	Currer	11		€.	Travel
or Weld 🗈		AWS	Size	Type &	: 0	*.		Speed
Layer(s)	Process	Classification	(in.)	Polarity	Amps	Volts		(in/min)
Any	SMAW	E7018	3/32	DCEP (reverse)	70 - 100	18	Ť:	5-7
Λny	SMAW	E7018	1/8	DCEP (reverse)	90 - 150	19	Α,	5.5-7.5
Any	SMAW	E7018	5/32	DCEP (reverse)	130 - 210	21	£1;	5.5-7.5

Additional Notes

JOINT NOTES:

(b)Joint shall be welded from one side only. (c) SMAW detailed joints may be used for prequalified GMAW (except GMAW-S) and FCAW.

Approved as noted, fll Freene (EOR)

2011 Form 010 - Fermat C

Touch Up: Use this system.

Two-Coating Systems

Epoxy Mastic - Surface-Tolerant Primer - Aluminum Color Only | Aliphatic Polyurethand

Surface Prep:

SSPC-SP7 (NACE No. 4) Brush-blast

finish, preferred. SSPC-SP3 Power-brush

finish, acceptable.

Anchor Pattern: 2.0 - 3.0 mils **Total DFT:** 

7.0 mils (min)

Coat, Generic Classification, DFT	Manufacturer	Product Designation	VOC (G/L)	By Max Svc Tem
PRIMER	Ameron	Amerlock 400 AL	120	
	Carboline	Carbomastic 15	88	
Epoxy Mastic - Surface Tolerant -	Devoe	Devran 224 Aluminum	212	
Aluminum Filled	Hempel Coatings (USA), Inc.	Hempadur 45880-19870	215	
Alumnum Fincu	International	Interseal 670 HS	240	
5.0 - 7.0 mils DFT	Jotun Paints	Jotamastic 87 AL	110	
	PPG Industries	97-148	0	
	Sherwin Williams	Epoxy Mastic Aluminum II B62S100/BV100	171	
	Sigma Coatings	TCP Aluminum 7477	240	
	System 2.15 is available in colors.			
TOPCOAT	Ameron	Amercoat 450 Series	335	
	Carboline	Carbothane 134 HG	288	
Polyurethane -	Devoe	Devthane 379	311	
Aliphatic	Hempel Coatings (USA), Inc.	5595U	312	
2.0 - 3.0 mils DFT	Hempel Coatings (USA), Inc.	Hempathane 5595	332	
	International	Interthane 990	395	
	International	Interthane 990HS	332	
	Jotun Paints	Hardtop HB	256	
	PPG Industries	95-8512	0	
- (A)	Sherwin Williams	Hi-Solids Polyurethane B65-300 SeriesB65/	289	
	Sigma Coatings	Sigmadur 500 US	320	
	Respirators are strongly recommended whe	n applying polyurethane.		

Volatile Organic Compound (VOC) limit may vary by location. Check local standards for current VOC limits. Consult manufacturer's product data sheets for specific details about applying any coating.

Last Update: 5/31/2006

**QRG - 29** 

September 2006

Inside Home Find & Search People Finder

ETC Search | Consultants Card | ETC Home



### **Chevron Engineering Standards**

Coatings Home | FE Home | CES Projects | Other Tech Publications | Links | Customer Service | Archived Project Specs

Coatings

Surface Prep:	J Self-Cured Inorgan	nic Zinc   Polyamide Epoxy (High Build)   Aliphatic Polyure	thane	3.1
SSPC-SP6 (NACE No. 3 Inish:	The second secon	Touch-up: Coating System (CS) 3.5. After applying the tie-coal exposing bare metal with CS 3.5. Repair any damage to the inc	at: (Repair any damage	368.8.4
Anchor Pattern:	1.5 - 2.5 mils	necessary, with CS 3.5 to maintain specified film thickness.).		
otal DFT:	9.0 mils (min)			
Coat, Generic Classification, DFT	Manufacturer	Product	voc	Tem;
	Ameron	Dimetcote 9	491	
	Ameron	Dimetcote 9HS	§323	
	Carboline	Carbozine 11	515	
	Carboline	Carbozine 11 HS	<b>§</b> 264	
	Devoe	Catha-Coat 304V	<b>§</b> 336	
	Hempel Coatings (USA), Inc.	Galvosil 1568	<b>§</b> 320	
PRIMER Self-Cured Inorganic inc - Solvent Reducible 2.0 - 3.0 mils DFT	Hempel Coatings (USA), Inc.	Galvosil 1578	520	
	International	Interzinc 22	490	
2.0 - 3.0 mile DFT	International	Interzinc 22HS	<b>§</b> 340	
	Jotun Paints	Resist 78	465	7
	PPG Industries	Metalhide 1001 Primer 97-673/97-674	397	1
	Sherwin Williams	Zinc Clad II B69V3/B69D11	462	1
	Sherwin Williams	Zinc Clad II HS B69VZ1/B69VZ3/B69D11	§312	7
	Sigma Coatings	SigmaZinc 158	507	-
	In the second second	ite mixed, using agitated pot while applying.		<del></del>
	Ameron	Amercoat 385	§276	7
	Carboline	Carboguard 893	§195	1
	Devoe	Devran 224HS	§212	-
TIECOAT	Hempel Coatings (USA), Inc.	Hempadur 4520	400	
Epoxy - Polyamide High Build	Hempel Coatings (USA), Inc.	Hempadur 45880	<b>§</b> 215	
	International	Intergard 475 HS	<b>§</b> 175	
5.0 - 7.0 mils DFT	Jotun Paints	Penguard Tlecoat 100	480	
i	PPG Industries	97-148	60	1
:	Sherwin Williams	Macropoxy 646 B58-600 Serles/B68V600	§235	1
	Sigma Coatings	SigmaCover 435	344	=
	Ameron	Amercoat 450 Series	§335	1
1	Carboline	Carbothane 134 HG	§288	$\dashv$
	Devce	Devthane 379	§311	-
	Hempel Coatings (USA), Inc.	5595U	§311 §312	
TOPCOAT	Hernpel Coatings (USA), Inc.	Hempathane 5595	<b>§</b> 332	
nyuremane - Anphanc	International	Interthane 990	395	1
2.0 - 3.0 mile DFT	International	Interthane 990HS	<b>\$</b> 332	1
	Jotun Paints	Hardton HB	§256	1
	PPG Industries	95-8512	§0	-
	Sherwin Williams	HI-Solids Polyurethane B65-300 SeriesB65/V30	<b>§</b> 289	1
	Sigma Coatings	Sigmadur 500 US	§320	-
F	The same of the sa	ecommended when applying polyurethane.	1 3250	1

<sup>§</sup> VOC at or below 340 g/l is the anticipated regulatory limit. Checklocal standards for current VOC limits. Consult manufacturer's product data sheets for specific details about applying any coating.

Last Update: 28 November 2007 © 2005 Chevron Corporation Content Contact: Brent Griffin Technical Contact: Ken Wasiichin

Company Confidentia Oaco: FTC Touch Up: Use this system.

### Specialty Coating Systems

### Polyester Non-Skid | 20 - 30 Mesh Grit | Polyester Non-Skid

Surface Prep:

SSPC-SP6 (NACE No. 3) Commercial blast finish; or SSPC-SP10 (NACE No. 2)

Near-white finish (Depends on

application.)

Anchor Pattern: 3.0 - 4.0 mils

Total DFT:

40.0 mils (min)

Coat, Generic Classification, DFT	Manufacturer	Product Designation	By Ma: VOC (G/L) Svc Ter
PRIMER	Dudick	Protecto-Coat 500	250
Polyester Non-Skid	Hempel Coatings (USA), Inc.	Polyester GF 35920	35
	International	Interzone 2000	35
30.0 - 40.0 mils DFT	Jotun Paints	Baltoflake	75
	PPG Industries	90000/90002	420
	Sherwin Williams	Coroplate I 948-W-016/531-0-006	240
	Must add sand.		
TIECOAT			
20 - 30 Mesh Grit			
		n-skid surface. Apply polyester first at 30 mils. Sprinkle Ch g al a rate of 15 - 18 lbs per 100 sq ft. Spray apply a final 1	
TOPCOAT	alumina, or other grit evenly over the coating		
TOPCOAT	alumina, or other grit evenly over the coating while the first coat is still sticky.	g at a rate of 15 - 18 lbs per 100 sq ft. Spray apply a final 1	10.0 mils of isopolyester over the gri
	alumina, or other grit evenly over the coating while the first coat is still sticky.  Dudick	g at a rate of 15 - 18 lbs per 100 sq ft. Spray apply a final o	10.0 mils of isopolyester over the grit
Polyester Non-Skid	alumina, or other grit evenly over the coating while the first coat is still sticky.  Dudick  Hempel Coatings (USA), Inc.	g at a rate of 15 - 18 lbs per 100 sq ft. Spray apply a final of Protecto-Coat 500 Polyester GF 35920	10.0 mils of isopolyester over the grit 250 35
TOPCOAT Polyester Non-Skid 10.0 - 15.0 mils DFT	alumina, or other grit evenly over the coating while the first coat is still sticky.  Dudick  Hempel Coatings (USA), Inc. International	g at a rate of 15 - 18 lbs per 100 sq ft. Spray apply a final of Protecto-Coat 500 Polyester GF 35920 Interzone 2000	10.0 mils of isopolyester over the grid 250 35 35
Polyester Non-Skid	alumina, or other grit evenly over the coating while the first coat is still sticky.  Dudick Hempel Coatings (USA), Inc. International Jotun Paints	g at a rate of 15 - 18 lbs per 100 sq it. Spray apply a final of Protecto-Coat 500 Polyester GF 35920 Interzone 2000 Baltoflake with Carborex 20	250 35 35 75

Volatile Organic Compound (VOC) limit may vary by location. Check local standards for current VOC limits.

Consult manufacturer's product data sheets for specific details about applying any coating.

Last Update: 5/31/2006

**QRG - 45** 

September 2006